SURVEYS INVESTIGATION

The most valuable information that a fishery research laboratory can have is a consistent body of data that may be used to evaluate secular changes in abundance, composition and distribution of the various species involved in any particular area. Analyses of catch statistics offers some crude estimates of these data but are all too frequently biased by poor areal coverage, selection of species and size of fish to be landed. Catch statistics do not supply any other data, such as that on hydrographic conditions, abundance of food and so forth.

With the acquisition of a new vessel, it is proposed that the laboratory set up a series of survey cruises, to be carried out periodically, for a number of years. The proposed surveys include the following:

1. Groundfish survey, quarterly
2. Hydrographic survey (in conjunction with #3), quarterly or twice a year depending upon specific needs of the Laboratory when new vessel is at hand
3. Plankton survey, as 2, above
4. Bottom community survey, quarterly and
5. Pelagic fish survey, no schedule as yet.

Each of these surveys is to be so designed and managed that the raw data will be prepared for publication prior to each succeeding cruise. Likewise, each survey will be modified slightly, if necessary, to provide specific information for various continuing investigations.

Specific descriptions of the proposed surveys follow:

1. Groundfish Survey

Not enough is known about the distribution and abundance of the major commercial groundfish species. Far less is known about species of minor commercial importance, and knowledge of species exploited lightly or not at all is extremely scant. Without expanded knowledge of abundance and distribution of commercial and potential commercial species and their ecological associates, efficient exploitation and management cannot be effected. For these reasons it is desired to initiate and maintain a routine groundfish survey.

The objective of the survey is to measure the abundance and distribution of the demersal fish populations of the Gulf of Maine, Georges Bank and adjacent areas, to evaluate fluctuations and changes in abundance, and to relate these where possible to seasonal and long-term variation in hydrographic conditions.

The first phase of the investigation is to be the assessment of previous surveys and the development of the most efficient means of measuring abundance and distribution, whether by geometric grids of stations, random grids, transects, or by some other method. When this phase is completed and a research vessel is available (probably FY 1962), a regular series of quarterly cruises will be carried out for a minimum period of five years. Each cruise will involve trawling operations and collection of sufficient hydrographic

and meteorological information to relate the collected information on distribution and abundance to environmental conditions. When a sufficient number of cruises have been made and sufficient data have been collected, probably after about three years, a rigorous evaluation of methods and procedure will be carried out and procedures modified appropriately.

2. Hydrographic Survey

Hydrographic surveys provide the primary information about the physical environment of marine animals. Commercial and non-commercial species of fish flourish in proper physical conditions, most important of which are perhaps temperature and salinity. Unsuitable physical conditions can cause reductions in numbers and in growth rate, and, at the extreme, death. In addition, chemical factors, primarily qualitative and quantitative variations in dissolved nutrients, drastically affect the phytoplankton populations, the basis of the food pyramid. For these reasons it is necessary that the hydrography of the area under study be well understood, not only for its own sake but because the area is one of the richest in the world in living marine resources, and comparison with other less rich areas will reveal just which are the most important hydrographic factors contributing to its abundance.

The objective of this survey is to learn as much as possible about the hydrography of the area and to integrate this information with data collected by other survey investigations and with investigations in other groups.

3. Plankton Survey

The organisms of the plankton provide the essential link between the potential production of the area and its actual production. In addition, many of the exploited and non-exploited animals spend more or less of their early lives as members of the plankton community. There is strong evidence that the year class strength of most of the commercial fishes is largely determined during their vulnerable planktonic phase.

The object of the plankton survey investigation is to learn as much as possible about the relation of the plankton organisms to their physical environment and to one another, in order to assess the productivity of the area and in order to predict (and even possibly control) the year class strengths of the commercially important species well in advance of their entering their respective fisheries as recruits. While a good deal is known about the plankton of the area, most of the information is essentially patchy and there is no continuous record of the plankton and its fluctuations for any substantial length of time.

The method of procedure will be to run quarterly surveys to assess both qualitatively and quantitatively the kinds and amounts of plankton present in the waters of the area.

4. Surveys of Bottom Communities

Bottom living invertebrate animals are the major source of food for the commercially valuable groundfish of the area. Thus they have an important bearing on the geographic occurrence, growth and

survival of the fish. Quantitative collections of these invertebrates are necessary to provide a basis for evaluating seasonal, regional and annual inventories of fish food supplies, particularly as they affect shifts in geographic occurrence and changes in growth rates and abundance of specific stocks of fish.

As a secondary purpose, these surveys will also provide the Woods Hole Laboratory with much-needed invertebrate specimens for life history studies of the invertebrates themselves--material of this sort is presently unavailable.

The basic method used will be quarterly surveys of the invertebrate bottom fauna of the area.

5. Pelagic Surveys

Pelagic fish, some of them migrating seasonally into New England waters, represent a commercial and recreational resource of unknown but potentially very large value. Except for herring, menhaden, mackerel, striped bass and some of the tunalike species, the pelagic fishes of the region are poorly documented. About 90 species of pelagic fish have been recorded from the Gulf of Maine, for example, and this does not include the groundfish, many of which are more or less pelagic at one time or another.

The recent discovery of commercial concentrations of tuna in waters bordering the continental shelf makes it even more important that we search out and evaluate the biological and commercial potential of the pelagic environment.

Since little is known about the fishes and of potential methods of capture, considerable exploratory work will have to be done, some of it probably in collaboration with other biological laboratories in the region and some with the Branch of Exploratory Fishing.

SURVEYS

List of Projects

1. Bottom Communities Survey
2. Pelagic Survey
3. Groundfish Survey
4. Hydrographic Survey
5. Plankton Survey

SUMMARY CONTT SCHEDULE

Investigation:
Biological Laboratory:

Project Title	Est.* Cost	Fiscal Years 57	58	59	60	61	62	63	64	65	66
Bottom Community Survey	87.0						1.5	22.0	20.5	21.5	21.5
Investigation Total	87.0	-	-	-	-	-	1.5	22.0	20.5	21.5	21.5

Annual Review		
Laboratory	Regional or Area Office	Washington Office

Prepared by: R. L. Edwards — Date 8/6/59

Recommended by: — Date

Lab. Director Herbert [illegible] Graham — 8/6/59

Reg. or Area Dir. Joseph [illegible]

Branch Chief

Approved by:

Division Chief for Director

*Total needed by Laboratory for Project in thousands of dollars.

Suggest survey investigation be combined with spruce investigations

#714 7/9/59

SUMMARY CON[illegible]L SCHEDULE

Investigation:
Biological Laboratory:

Project Title	Est.* Cost	Fiscal Years 57	58	59	60	61	62	63	64	65	66
Pelagic Survey	76.4								24.4	26.5	27.5
Investigation Total	76.4	-	-	-	-	-	-	-	24.4	26.5	27.5

Annual Review

Laboratory	Regional or Area Office	Washington Office

Prepared by: R. L. Edwards — Date 8/6/59

Recommended by:

Lab. Director Herbert W. Graham — Date 8/6/59

Reg. or Area Dir. Joseph T. Penniket — 1 AUG 1959

Branch Chief

Approved by:

Division Chief for Director

*Total needed by Laboratory for Project in thousands of dollars.

Suggest survey investigation McCormick with species investigations.

#714 7/9/59

SUMMARY CO[illegible]L SCHEDULE

Investigation:
Biological Laboratory:

Project Title	Est.* Cost	Fiscal Years 57	58	59	60	61	62	63	64	65	66
Groundfish Survey	71.8						8.0	15.9	15.9	16.0	16.0
Investigation Total	71.8	-	-	-	-	-	8.0	15.9	15.9	16.0	16.0

Annual Review

Laboratory	Regional or Area Office	Washington Office

Prepared by: R. L. Edwards — Date 8/6/59

Recommended by:

Lab. Director Herbert W. Graham — 8/6/59

Reg. or Area Dir. Joseph F. Pierce — 21 AUG 1959

Branch Chief [illegible] — 8/6/59

Approved by: [illegible]
Division Chief for Director

*Total needed by Laboratory for Project in thousands of dollars.

Suggest survey investigation be combined with species investigations. #714 7/9/59

SUMMARY CO[illegible]L SCHEDULE

Investigation:
Biological Laboratory:

Project Title	Est.* Cost	Fiscal Years 57	58	59	60	61	62	63	64	65	66
Hydrographic Survey	76.6					7.0	7.6	15.8	15.0	15.4	15.8
Investigation Total	76.6	-	-	-	-	7.0	7.6	15.8	15.0	15.4	15.8

Annual Review		
Laboratory	Regional or Area Office	Washington Office

Prepared by: R. L. Edwards — Date 8/6/59

Recommended by:

Lab. Director Herbert W. Graham — Date 6 AUG 1959

Reg. or Area Dir. [signature] — Date 21 AUG 1959

Branch Chief

Approved by:

Division Chief for Director

*Total needed by Laboratory for Project in thousands of dollars.

#714 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Hydrographic Survey, preliminary studies

Investigation Title: Surveys

Investigation Chief: Vacant

Project Leader: Vacant
Name Title Grade

Assistants: (Title and Grade)

Collaborators:

Need for Information: To review previous studies, analyze present data and develop operational procedure for future routine surveys.

Objective: To plan hydrographic surveys.

Method of Procedure:

Phase 1:

Phase 2:

Hydrographic Survey
Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 76.6

	FY 1959	FY 1960	FY 1961
Personal Services	--	--	6.0
Other Expenses:			
Within Project	--	--	1.0
Lab. Adm. & Ser.	--	--	--
Lab. Total	--	--	7.0
Regional Office			.07
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY 61; Phase 2 FY ; Phase 3 FY ; Project FY

Recommended by:

		Date
Originator	Vacant	~~8/6/59~~
Investigation Chief	Vacant	
Laboratory Director	Herbert W. Graham	8/6/59
Regional Director	Joseph F. Dunnerstick	8/19/59
Branch Chief		

Approved by:

Division Chief for Director

Remarks

(Continue on reverse side)

#715 7/9/59

SUMMARY CO. .OL SCHEDULE

Investigation:
Biological Laboratory:

Project Title	Est.* Cost	Fiscal Years 57	58	59	60	61	62	63	64	65	66
Plankton Survey	157.5					2.7	19.9	34.1	33.0	33.6	34.2
Investigation Total	157.5	-	-	-	-	2.7	19.9	34.1	33.0	33.6	34.2

Annual Review		
Laboratory	Regional or Area Office	Washington Office

Prepared by: R. L. Edwards — Date 8/6/59

Recommended by:

Lab. Director Herbert W. Graham — Date 8/6/59

Reg. or Area Dir. [signature] — 1 AUG 1959

Branch Chief

Approved by:

Division Chief for Director

*Total needed by Laboratory for Project in thousands of dollars.

Suggest survey investigations be combined with special investigations

#714 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Plankton Survey, preliminary planning

Investigation Title: Survey

Investigation Chief: Vacant

Project Leader: Vacant
Name — Title — Grade

Assistants: (Title and Grade)

Collaborators:

Need for Information: To provide necessary information about needs of various laboratory investigations for information concerning plankton and to prepare a properly integrated plan for the plankton survey.

Objective: To present plan of operations for the plankton survey.

Method of Procedure:

Phase 1:

Phase 2:

Plankton Survey
Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 157.5

	FY 1959	FY 1960	FY 1961
Personal Services	--	--	1.2
Other Expenses: Within Project	--	--	1.5
Lab. Adm. & Ser.	--	--	--
Lab. Total	--	--	2.7
Regional Office			.027
Washington Office			
Total			

Recommended Source of Funds **S-K and Regular**
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY 61 ; Phase 2 FY ; Phase 3 FY ; Project FY

Recommended by:

		Date
Originator	**Vacant**	
Investigation Chief	**Vacant**	
Laboratory Director	**Herbert W. Graham**	8/6/59
Regional Director	Joseph F. Pomeroy	8/19/59
Branch Chief		

Approved by:
Division Chief for Director

Remarks

(Continue on reverse side)

#715 7/9/59